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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/665,208	09/18/2000	Chang-seok Kang	5649-842	4274

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EXAMINER	
MOORE, KARLA A	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 12/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/665,208	KANG ET AL.	
	Examiner	Art Unit	
	Karla Moore	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 September 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *24,25,27-35,45-50,55 and 58* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24-25,27-35,45-50, 55,58* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 9/19/00 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 27-29, 31-35, 55 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,501,739 to Yamada et al. in view of U.S. Patent No. 6,096,597 to Tsu et al.

3. Yamada et al. disclose the invention substantially as claimed and comprising: a multi-functional plasma chamber (Figure 6, 102) capable of depositing a dielectric layer on a substrate, the chamber comprising: a support plate (103) configured to hold a substrate; a heater unit (not numbered) positioned under (the top surface of the support plate; a source dispersion device (multiple part numbers, 116-118) positioned above the support plate and configured to uniformly disperse organic source liquid; and a source supplier (multiple part numbers, 113-115) in fluid communication with the source dispersion device).

4. However, Yamada et al. fail to teach the plasma chamber having an oxygen radical or plasma annealing unit connected to the chamber the annealing unit capable of supplying a gas selected from the group consisting of O_2, NH3, Ar, N_2 and N_2O.

5. Tsu et al. teach performing a plasma anneal and an ozone anneal after depositing a dielectric layer for the purpose of improving capacitor electrical performance including the effective oxide thickness and leakage current density (column 6, rows 25-36).

6. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an oxygen radical or plasma annealing unit in Yamada et al. in order to improve capacitor electrical performance including the effective oxide thickness and leakage current density as taught by Tsu et al.

7. With respect to claims 28 and 29, Yamada et al. further teach: a liquid mass flow controller (118) configure to control a flow of organic source liquid; an evaporator (column 7, rows 5-28) in fluid communication with the flow controller and configured to evaporate the source liquid; and a transfer gas source (column 4, rows 54-59) in fluid communication with the evaporator and configure to transfer an organic source from the evaporator to the source dispersion device.

8. With respect to claims 31 and 32, Yamada et al. teach constructing a multi-chamber apparatus comprising a transfer chamber (109) and a load lock chamber (135). Any of the chambers connect to the transfer chamber could be a multi-functional chamber or a deposition chamber.

9. With respect to claim 33, further teach using crystallization anneal for the purpose of transforming an amorphous layer into a crystalline one, thus improving capacitor performance (column 6, rows 53-62).

10. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a crystallization anneal chamber in Yamada et al. in order to transform an amorphous layer into a crystalline one, thus improving capacitor performance as taught by Tsu et al.

11. With respect to claim 34, any one of the chambers connected to the transfer chamber could be a multi-functional chamber as described above capable of oxygen radical or plasma annealing.

12. With respect to claim 35, Yamada et al. teach the use of a pre-heating chamber (column 3, rows 20-22) for the purpose of heating a substrate to a pre-determined temperature and a cooling chamber (column 3, rows 39-44) for the purpose of cooling a substrate.

13. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a cooling chamber and a pre-heating chamber connected to the transfer chamber in Figure 8 of Yamada et al. in order to heat a substrate to a desired temperature before processing and cool a substrate to a desired temperature after processing without subjecting the substrate to the outside atmosphere (column 10, rows 9-33) as taught by Yamada et al.

15. With respect to claims 55 and 58, the apparatus described above would be capable of supplying the materials recited. The courts have ruled expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim. Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969).

16. Claims 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. and Tsu et al. as applied to claim 27 above, and further in view of U.S. Patent No. 5,217,559 to Moleskin et al.

17. Yamada et al. and Tsu et al. disclose the invention substantially as claimed and as described above.

18. However, the prior art fails to teach the oxygen radical or plasma annealing unit is an ozone generator/plasma generator.

19. Moleskin et al. teach the use of an ozone generator/plasma generator for the purpose of generating a plasma species for substrate processing (column 4, rows 19-25).

20. It would have been obvious to one of ordinary skill in the art to have provided a plasma generator in the prior art in order to generate a plasma species for processing a substrate as taught by Moleskin et al.

21. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. and Tsu et al. as applied to claim 27 above, and further in view of U.S. Patent No. 4,578,880 to Montev et al.

22. The prior art discloses the invention substantially as claimed and as described above.

23. However, the prior art fails to teach that the multi-functional chamber further comprises an ozone remover connected to an exhaust end.

24. Montev et al. teach providing an ozone remover for the purpose of preventing ozone from accumulating in a work area (column 8, rows 22-30).

25. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an ozone remover in the prior art in order to prevent ozone accumulation as taught by Montev et al.

26. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. and Tsu et al. as applied to claim 27 above, and further in view of U.S. Patent 4,786,352 to Benzing.

27. Yamada et al. and Tsu et al. disclose the invention substantially as claimed and as described above.

28. However, the prior art fails to teach a cleaning gas supplier in fluid communication with the multi-functional chamber.

29. Benzing teaches the use of a cleaning gas supply (column 2, rows 2-8 and column 12, rows 41-46) for the purpose of cleaning any tooling (i.e. walls of the chamber) or surfaces of substrates.

30. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a cleaning gas supply in the prior art in order to clean any tooling of the surfaces of substrates as taught by Benzing.

31. Claims 45-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,501,739 to Yamada et al. in view of U.S. Patent No. 6,096,597 to Tsu et al., in view of U.S. Patent 4,786,352 to Benzing

32. Yamada et al. disclose the invention substantially as claimed and comprising: a multi-functional plasma chamber (Figure 6, 102) capable of depositing a dielectric layer on a substrate, the chamber comprising: a support plate (103) configured to hold a substrate; a heater unit (not numbered) positioned under (the top surface of the support plate; a source dispersion device (multiple part numbers, 116-118) positioned above the support plate and configured to uniformly disperse organic source liquid; and a source supplier (multiple part numbers, 113-115) in fluid communication with the source dispersion device).

33. Yamada et al. further teach: a liquid mass flow controller (118) configure to control a flow of organic source liquid; an evaporator (column 7, rows 5-28) in fluid communication with the flow controller and configured to evaporate the source liquid; and a transfer gas source (column 4, rows 54-59) in fluid communication with the evaporator and configure to transfer an organic source from the evaporator to the source dispersion device.

34. With respect to claim 46 and 47, Yamada et al. teach constructing a multi-chamber apparatus comprising a transfer chamber (109) and a load lock chamber (135). Any of the chambers connect to the transfer chamber could be a multi-functional chamber or a deposition chamber.

35. However, Yamada et al. fail to teach the plasma chamber having an oxygen radical or plasma annealing unit connected to the chamber the annealing unit capable of supplying a gas selected from the group consisting of O_2, NH_3, Ar, N_2 and N_2O.

36. Tsu et al. teach performing a plasma anneal and an ozone anneal after depositing a dielectric layer for the purpose of improving capacitor electrical performance including the effective oxide thickness and leakage current density (column 6, rows 25-36).

37. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an oxygen radical or plasma annealing unit in Yamada et al. in order to improve capacitor electrical performance including the effective oxide thickness and leakage current density as taught by Tsu et al.

38. With respect to claim 48, further teach using crystallization anneal for the purpose of transforming an amorphous layer into a crystalline one, thus improving capacitor performance (column 6, rows 53-62).

39. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a crystallization anneal chamber in Yamada et al. in order to transform an amorphous layer into a crystalline one, thus improving capacitor performance as taught by Tsu et al.

40. With respect to claim 49, any one of the chambers connected to the transfer chamber could be a multi-functional chamber as described above capable of oxygen radical or plasma annealing.

41. With respect to claim 50, Yamada et al. teach the use of a pre-heating chamber (column 3, rows 20-22) for the purpose of heating a substrate to a pre-determined temperature and a cooling chamber (column 3, rows 39-44) for the purpose of cooling a substrate.

42. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a cooling chamber and a pre-heating chamber connected to the transfer chamber in Figure 8 of Yamada et al. in order to heat a substrate to a desired temperature before processing and cool a substrate to a desired temperature after processing without subjecting the substrate to the outside atmosphere (column 10, rows 9-33) as taught by Yamada et al.

43. Yamada et al. and Tsu et al. disclose the invention substantially as claimed and as described above.

44. However, the prior art fails to teach a cleaning gas supplier in fluid communication with the multi-functional chamber.

45. Benzing teaches the use of a cleaning gas supply (column 2, rows 2-8 and column 12, rows 41-46) for the purpose of cleaning any tooling (i.e. walls of the chamber) or surfaces of substrates.
It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a cleaning gas supply in the prior art in order to clean any tooling of the surfaces of substrates as taught by Benzing

Response to Arguments

46. Applicant's arguments filed 19 September 2003 have been fully considered but they are not persuasive. Applicant argues that Tsu et al. fails to teach a plasma chamber having an oxygen radical or plasma annealing unit connected, but rather teaches a process for performing an oxygen radical or plasma annealing. Examiner points out that an apparatus for performing this method is inherently present, although not specifically mentioned. The method could not be performed without some sort of apparatus capable of performing the process. Applicant further argues that there is not motivation for the combination of the Yamada et al. and Tsu et al. references. Examiner directs attention to the passages highlighted in the previous office action, which teach that the oxygen radical or plasma annealing, post dielectric deposition (the type of deposition disclosed in Yamada et al.), improves capacitor electrical performance including effective oxide thickness and leakage current density. Additionally, for the same reasons that the teachings of a oxygen radical or plasma annealing process inherently disclose an apparatus capable of performing the process, the Tsu et al. teachings of a crystallization process following a deposition process also inherently include an apparatus capable of performing a crystallization process.

Conclusion

47. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 703.305.3142. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703.308.1633. The fax phone number for the organization where this application or proceeding is assigned is 703.872.9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

Primary Examiner
AU 1763
P. Hassanzadeh

km
08 December 2003